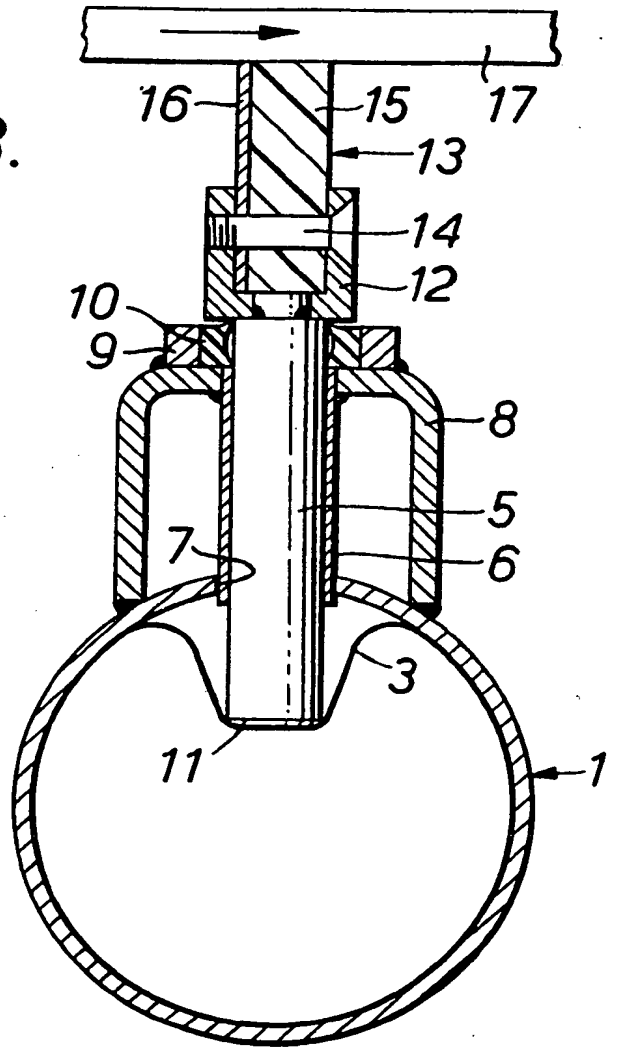
(12) UK Patent Application (19) GB (11) 2 081 662 A

(21) Application No 8025926
(22) Date of filing 8 Aug 1980
(43) Application published
24 Feb 1982
(51) INT CL³
B65G 45/00
(52) Domestic classification
B8A LE R8
(56) Documents cited
GB 1508310
GB 1031604
EP 0004809A
(58) Field of search
B8A
(71) Applicants
Salgar Supplies Limited,
24 Exchange Street,
Retford, Nottinghamshire
DN22 6DT
(72) Inventor
Ronald Booth Rhodes
(74) Agents
M. J. Stephens & Co.,
Royal Building, 11 St.
Andrew's Cross,
Plymouth PL1 2DS

(54) **Conveyor belt cleaning device**

(57) A conveyor belt cleaning device has a resiliently flexible scraper blade (13) which is supported by a number of independently movable support members (5, 8, 12) spaced apart at intervals along the length of the blade (13). The support members (5, 8, 12) engage a flexible walled container (3) which contains fluid under pressure to urge the scraper blade (13) into contact with a surface of the conveyor belt (17) with a force which is uniformly distributed over the width of the belt (17).

FIG.3.



GB 2 081 662 A

The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy.

FIG.1.

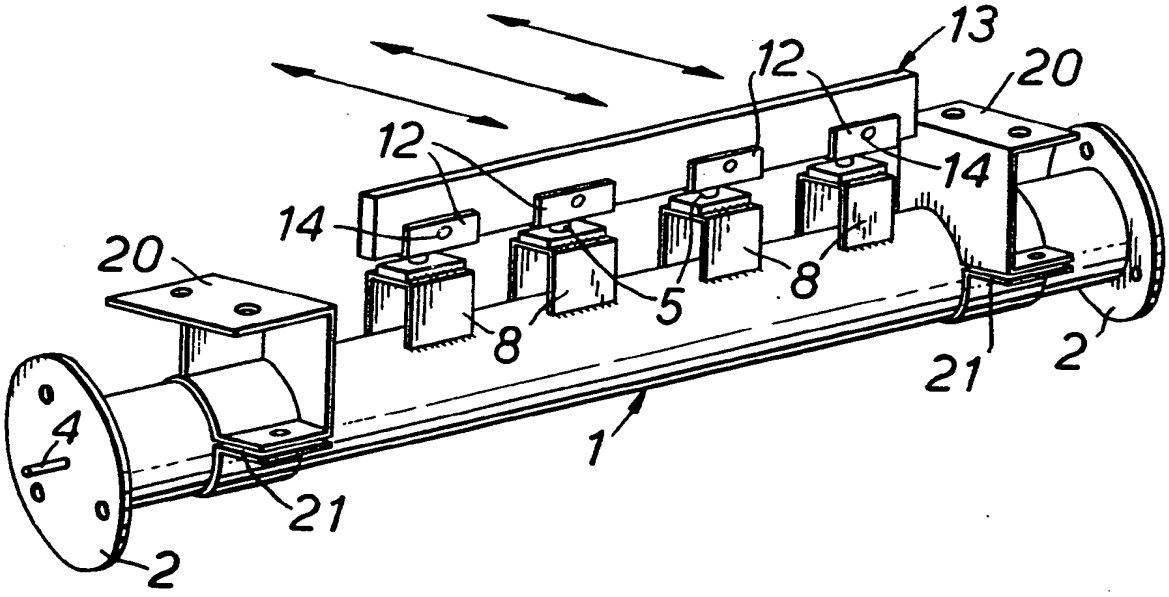


FIG.2.

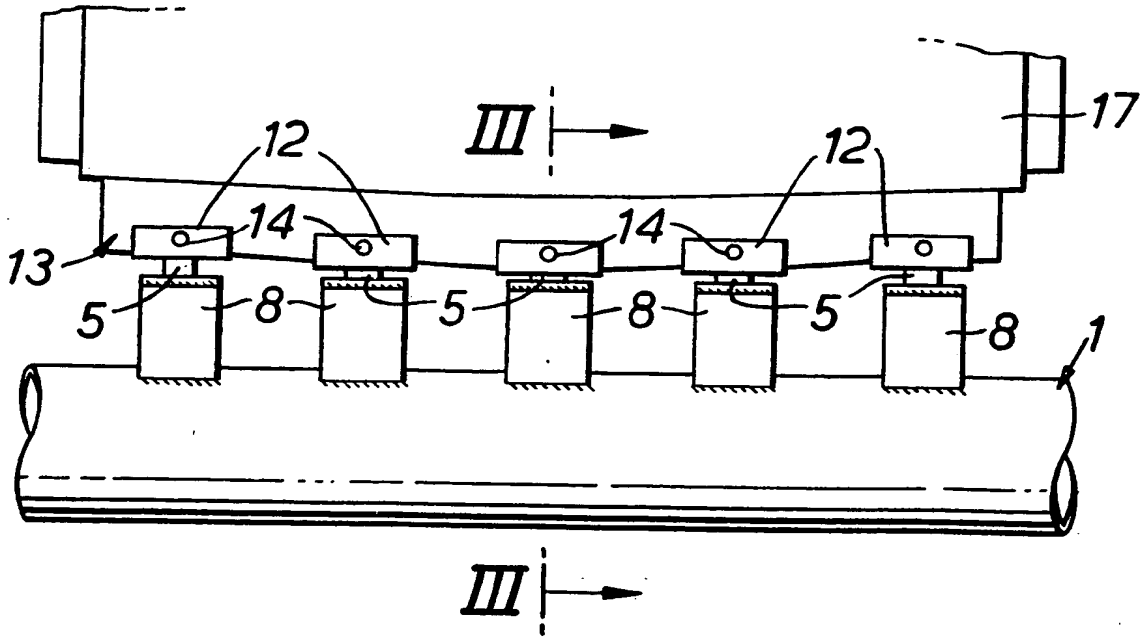


FIG.3.

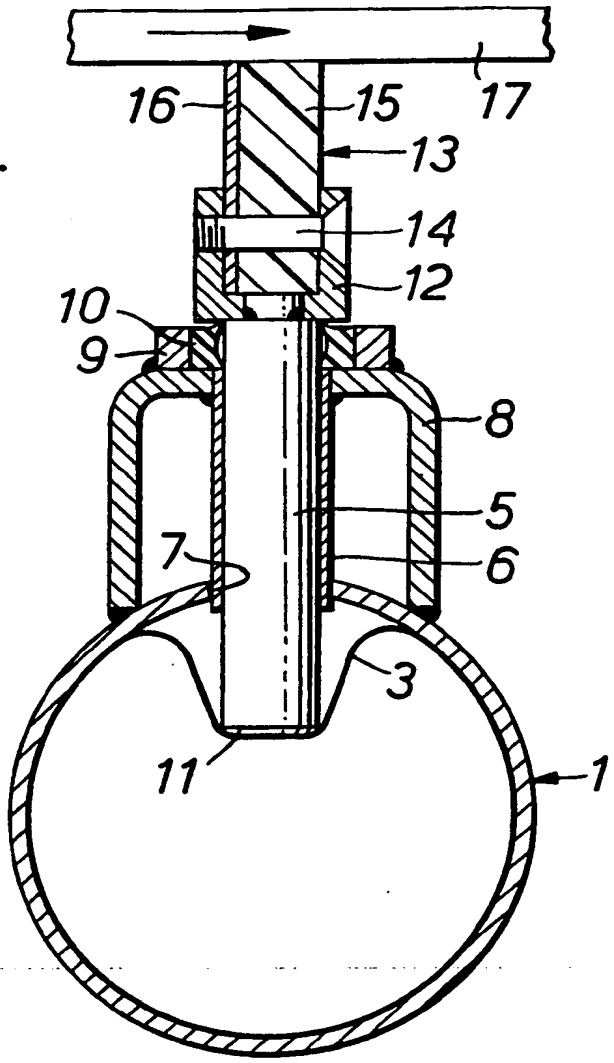
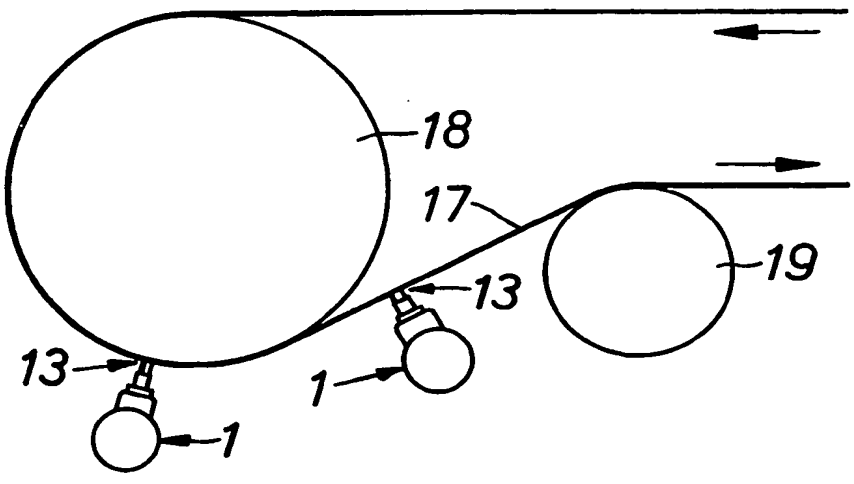


FIG.4.



SPECIFICATION

Conveyor belt cleaning device

This invention relates to conveyor belt cleaning devices.

Various types of conveyor belt cleaning devices are known in which a scraper blade is resiliently supported so that it is maintained in contact with a conveyor belt surface to be cleaned. In a commonly used arrangement the scraper blade is mounted on springs which urge the blade into scraping contact with the conveyor belt surface. Normally the mounting springs are located at opposite ends of the scraper blade. A problem associated with such conveyor belt cleaning devices is that of maintaining an even contact pressure between the scraper blade and the belt surface over the entire width of the conveyor belt. This problem is particularly acute where the conveyor belt has a non-linear transverse profile, for example where the tension in the belt is unequally distributed over the width of the belt, or where the belt passes over a drum having a cambered profile.

An object of the present invention is to provide a conveyor belt cleaning device in which a scraper blade is maintained by fluid pressure in contact with a conveyor belt surface, with a force which is substantially uniformly distributed over the width of the belt. A rotary conveyor belt cleaner has been proposed (U.K. Patent No. 1508310) in which a rigid cleaning blade is supported by a hollow rotor and is urged into contact with a conveyor belt by the application of fluid pressure to a flexible bag housed within the rotor. Each cleaning blade is supported on rods which are interconnected by a rigid rail which makes contact with a longitudinal surface of the pressurized bag. With this arrangement, the belt cleaning blade will not apply a uniform scraping pressure to a conveyor belt which has a curved transverse profile since, even if the blade were sufficiently flexible to conform to the profile of the belt, such flexing would be prevented by the rigid interconnection of the blade supports within the rotor.

The present invention provides a conveyor belt cleaning device comprising a resiliently flexible scraper blade supported by a number of independently movable support members spaced apart at intervals along the length of the blade, the support members engaging a flexible-walled container which in use of the device contains fluid under pressure to urge the scraper blade into contact with a conveyor belt surface to be cleaned.

Since the support members carrying the scraper blade are independently movable, and the blade itself is resiliently flexible, the scraper blade can, within limits, conform to the transverse profile of a conveyor belt to be clean d. The scraper blade will apply a substantially uniform cleaning pr ssure to th belt surfac by virtue of the engagement of th blade support m mbers with the fl xible-walled pressurized container.

By selection of a suitable operating pressure within the pressurized container, typically between 8 and 10 psi it is possible to establish a contact pressure between a scraper blade and the belt surface which is just sufficient to ensure adequate cleaning of the belt, while minimizing wear of the conveyor belt and the blade.

Preferably the support members are slidable in seals carried by a housing which encloses the flexible walled container. This ensures that material which is scraped from the conveyor belt by the scraper blade does not interfere with the free sliding movement of the support members.

Each blade support member preferably comprises a push rod which is attached at one end to the scraper blade and which engages the flexible-walled container at its other end. Each push rod may be provided with a U-section shoe at said one end which embraces the edge of the scraper blade opposite the scraping edge and which is connected to the latter by a pin passing through the shoe and the scraper blade. The mounting arrangement ensures that the blade can flex longitudinally to accommodate changes in the conveyor belt profile, without affecting the freedom of sliding movement of the push rods. Each push rod may be slidable in a guide tube which is supported by the housing. This guide tube may adjoin the seal for the push rod, or may be formed integrally with the seal.

The scraper blade employed in the belt cleaning device of the present invention preferably comprises a resiliently flexible base strip of plastics material, for example, polyurethane, provided with at least one insert or facing of wear-resistant material. For example, the base strip may be provided with a number of face plates bonded to one face of the base strip at intervals to permit flexing of the blade along its length. Surface coatings or layers of wear-resistant material, for example ceramic material, abrasive materials, or hardened steel, may be applied to or bonded to the face plates according to the intended practical application of the belt cleaning device.

The housing which encloses the flexible-walled container may conveniently be in the form of a rigid tube which is supported at opposite ends by adjustable clamps by means of which the tube may be mounted in any desired angular orientation about its longitudinal axis to mount the scraper blade with a desired angle of attack relative to the conveyor belt surface.

The invention will be further described, by way of example only, with reference to the accompanying purely diagrammatic drawings, in which:

Figure 1 is a perspective view of a conveyor belt cleaning device according to one embodiment of the invention;

Figure 2 is a sid elevational view of part of the conveyor belt cleaning d vice shown in Figure 1, viewed in th dir ction of belt travel;

Figure 3 is a transverse cross-sectional view, on an enlarged scale, taken on the lines III—III in Figure 2, and

Figure 4 is a diagram illustrating part of a typical conv yor belt and showing two mounting positions for cleaning devices according to the invention.

The illustrated conveyor belt cleaning device has a rigid housing in the form of a steel tube 1 closed at opposite ends by flanged cover plates 2. Housed within the tube 1 is a flexible-walled container comprising a sealed air bag 3 of reinforced plastics material or rubber (Figure 3). Air under pressure may be supplied to the air bag 3 through a valved connector 4 located centrally in one of the cover plates 2.

Cylindrical push rods 5 are freely and independently slidable in respective guide tubes 6 inserted in respective circular holes 7 provided at qual intervals along the length of the housing tube 1, each guide tube 6 being a close fit in the r spective hole 7. The guide tubes 6 are supported by respective U-section bridge pieces 8 which are welded to the external surface of the housing tube 1 at the site of each hole. Each bridge piece 8 supports on its upper surface an annular seal housing 9 in which an annular sealing element 10 of resilient material is housed. The sealing element 10 makes sealing contact with the external surface of the associated push rod 5.

Each push rod 5 has an inner end 11 which projects beyond the guide tubes 6 into the interior of the housing tube 1, and into engagement with the flexible-walled bag 3, as shown diagrammatically in Figure 3. The inner end 11 of each push rod 5 may be suitably bevelled or rounded to prevent abrasion of the bag 3 by the rod. At its outer end each push rod 5 is provided with a U-section shoe 12 which, in the illustrated example, is attached to the push rod 5 by welding.

A scraper blade 13 is seated in the shoes 12 of the push rods 5 and extends generally parallel to the longitudinal axis of the housing tube 1. The scraper blade 13 is positively secured to each shoe 12 by a transverse pin 14 which passes through the opposite wall of the shoe 12 and through a hole in the scaper blade 13. In the illustrated example, each pin 14 is in the form of a bolt having a screw-threaded end which is screwed into a threaded bore in one of the walls of the respective shoe 12.

The scaper blade 13 comprises a resiliently flexible base strip 15 of solid plastics material, preferably polyurethane, provided on one face with a number of face plates 16 bonded to one face of the base strip 15 at intervals such as to permit longitudinal flexing of the blade 13. The bas plates 16 may be of any suitable wear-r sistant material such as steel, hardened plastics, abrasive material or ceramic material. Alternatively, surface coatings or layers of suitable wear-resistant material may be applied to or bonded t the face plates 16.

Although the face plates 16 as illustrated in Figure 3 are applied to one face only of the base strip 15, it will be appreciated that in practice fac plates may be applied to both major faces of the base strip 15. Alternatively, the bas strip 15 may be provided with wear-resistant inserts.

The scraper blade 13 is maintained in scraping contact with a surface of a conveyor belt 17 to be cleaned by the application of a suitable pneumatic pressure to the air bag 3. In a typical installation a pressure of between 8 and 10 psi of air in the air bag would be sufficient to maintain the scraper blade 13 in effective scraping contact with the conveyor belt 17. Since the scraper blade 13 is resiliently flexible, the blade can, within limits, conform to the transverse profile of a conveyor belt to be cleaned, as illustrated in Figure 2. There is sufficient clearance in the housing of the scraper blade 13 in the shoes 12 to permit such flexing by pivotal movement of the blade about the respective pins 14 which secure the blade to the shoes 12. Since the push rods 5 are independently and freely slidable in the guide tubes 6 the scraper blade 13 can flex to accommodate changes in the belt profile across its width, while maintaining a substantially uniform contact pressure between the scraper blade 13 and the surface of the belt 17.

Debris scraped from the conveyor belt 17 is prevented from entering the clearance space between the guide tubes 6 and the push rods 5 by the annular seals 10, so that the cleaning device maintains its effectiveness in prolonged use.

The cleaning device may be mounted in contact with an unsupporting part of a conveyor belt 17, for example, between a head drum 18 and a snub drum 19, or may be located in contact with a conveyor belt 17 where it passes over a drum. Two such alternative mountings for a conveyor belt cleaning device according to the invention are illustrated diagrammatically in Figure 4.

The scraper blade 13 may be supported at any desired angle of attack with respect to the surface of a conveyor belt 17 to be cleaned. In most practical applications the plane of the scraper blade 13 will be perpendicular to the surface of the conveyor belt 17, as illustrated in Figures 3 and 4. The correct angular adjustment of the scraper blade is easily achieved by an adjustable support for the housing tube 1. Thus as illustrated in Figure 1 the housing tube 1 is supported near its opposite ends by two mounting brackets 20 which incorporate respective screwclamps 21 by means of which the tube 1 may be fixed in any desired angular position about its longitudinal axis.

The belt cleaning device according to the invention is suitable for use on reversible conveyor belts, in that it is equally effective for either direction of movement of the conveyor belt relative to the scraper blade, as indicated by the double arrows in Figure 1.

CLAIMS

1. A conv yor belt cleaning device comprising a resiliently flexible scraper blade supported by a number of ind pendently movable support members spaced apart at intervals along the length of the blade, the support members engaging a flexible-walled container which in use of the device contains fluid under pressure to urge

the scraper blade into contact with a conveyor belt surface to be cleaned.

2. A device as claimed in Claim 1, in which the support members are slidable in seals carried by a housing which encloses the flexible-walled container.

3. A device as claimed in Claim 1 or Claim 2, in which each support member comprises a push rod which is attached at one end to the scraper blade and which engages the flexible-walled container at its other end.

4. A device as claimed in Claim 3, in which each push rod is provided with a U-section shoe at said one end which embraces the edge of the scraper blade opposite its scraping edge and which is connected to the latter by a pin passing through the shoe and the scraper blade.

5. A device as claimed in Claim 3 or Claim 4, in which each push rod is slidable in a guide tube which is supported by the housing.

6. A device as claimed in any one of the preceding claims, in which the scraper blade comprises a resiliently flexible base strip of plastics material supporting a face plate or plates on one or both major faces.

7. A device as claimed in Claim 6, in which a number of face plates are bonded to one face of the flexible base strip at intervals to permit flexing of the blade along its length.

8. A device as claimed in Claim 7, in which surface coatings or layers of wear-resistant material are applied to or bonded to the face plates of the scraper blade.

9. A conveyor belt cleaning device substantially as herein described, with reference to and as shown in the accompanying drawings.

Printed for Her Majesty's Stationery Office by the Courier Press, Leamington Spa, 1982. Published by the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.